

NC Reuse Rule Enhancements

A NC AWWA/WEA Collaborative Approach

Don Safrit, P.E.
HDR Engineering, Inc. of the
Carolinas
Calabash Office
don.safrit@hdrinc.com
(910)575-5880



Water Reuse Terms Defined

- **Reclaimed Water**
 - **Water Derived from the Treatment of Domestic, Municipal or Industrial Wastewater that is Suitable for a Beneficial Use**
- **Reuse**
 - **Use of Reclaimed Water**

Reuse is Not Disposal – You are Producing and Recycling a Valuable Product!



NC Reuse History

- 1988 – Golf Course Irrigation
- 1996 – Domestic, Municipal and Industrial
 - Landscape Irrigation
 - Industrial – process, cooling, boilers
 - Fire protection, Street Cleaning, Dust Control
- 2007 – Enhanced Rules
 - Wetland Enhancement / Restoration
 - Stream Augmentation
 - Aquifer Recharge / Storage
 - Food Chain Crops / Indirect / Direct Potable Use

Why Reuse Water?

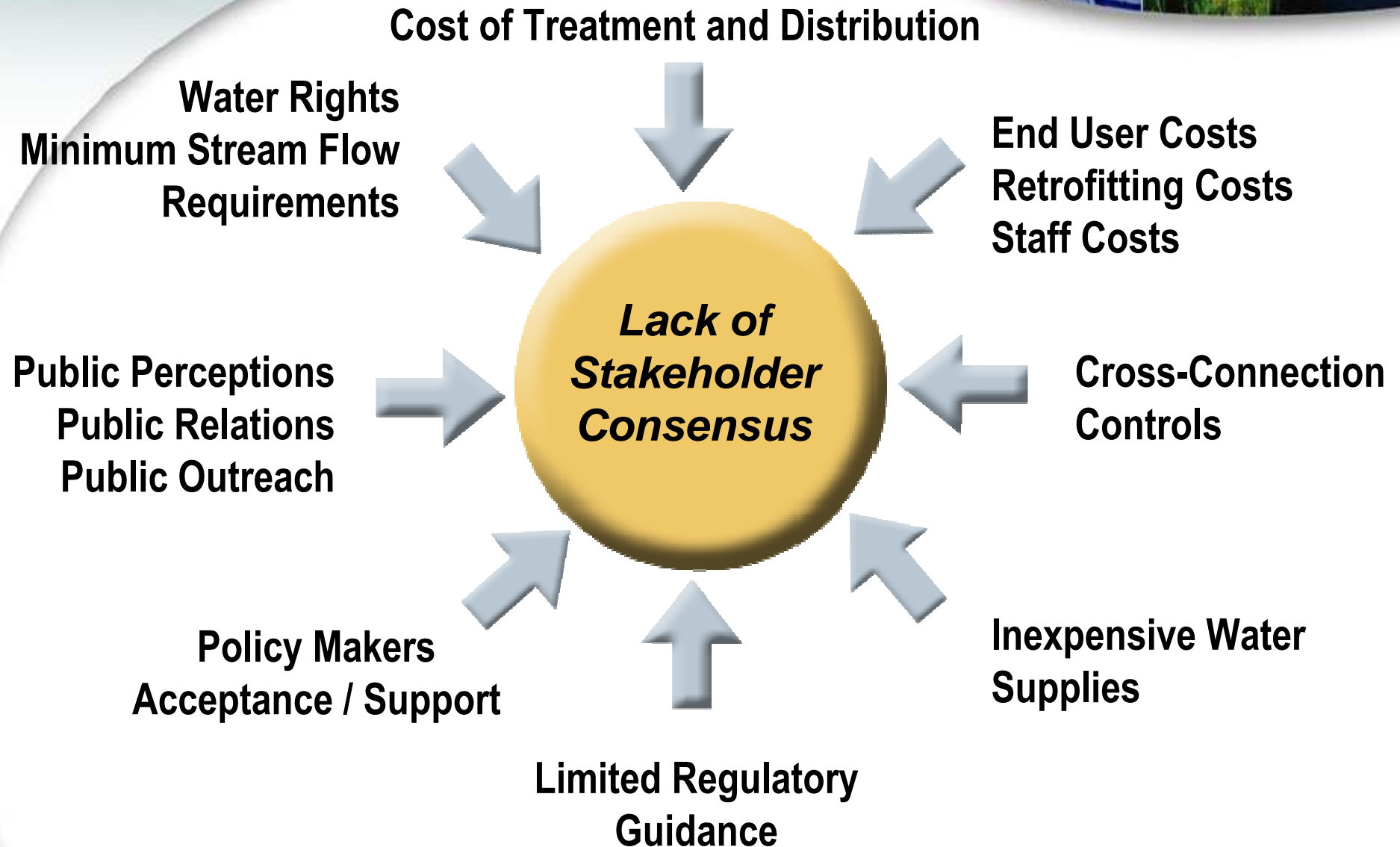




Benefits of Reuse

- Dependable, Reliable, Clean Source of Water, Even in Cases of Severe Drought.
- Displace Use of Potable Water Thus Off-Setting Need for New Water Sources or Expansion of Existing Supplies.
- Helps Avoid Dramatic “Swings” in Water Plant Operations Due to Irrigation Demands or Other Peaks – Allows a “Steady State” Mode of Operation Opportunity.
- Source of Revenue to Offset or Cover the Cost of Treatment and Distribution.
- MBR Technology may Provide More Cost Effective Reclaimed Water Approaches as Opposed to Conventional Treatment Technologies.
- Satellite or Decentralized Facilities may provide Wastewater Treatment System Redundancies.
- Preferred Means of Wastewater Management by Regulatory Agencies, Environmental Groups, and General Public.

Obstacles to Water Reuse



AWWA WEA Water Reuse Committee Business Plan Initiatives

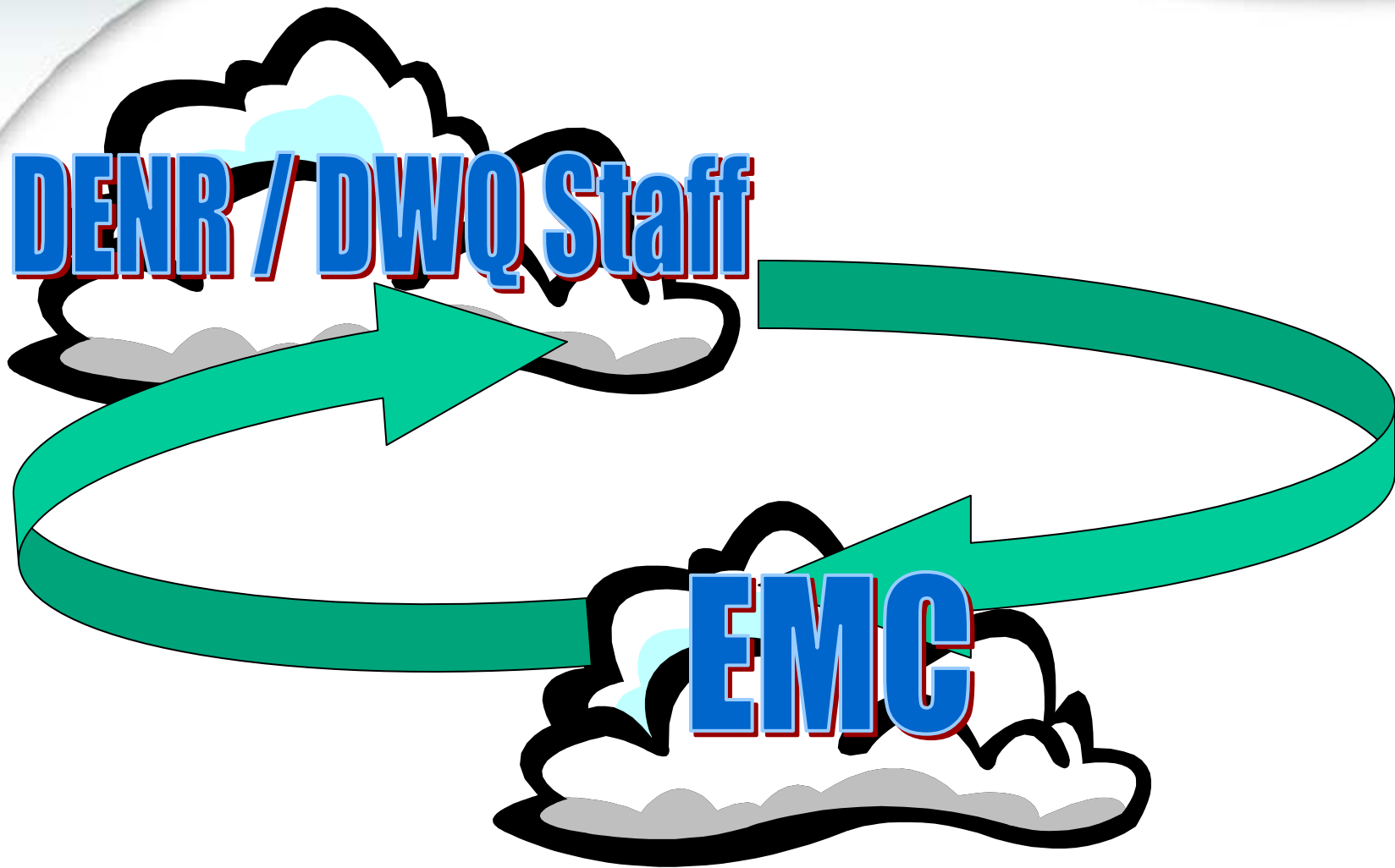
- Provide Training Opportunities
 - Annual Reuse Seminar
 - Encourage Reuse Presentations at Conferences
 - Maintain Database of Reuse Papers and Speakers
- Improve Communications
 - Maintain Reuse Website
 - Maintain Reuse Project Database
 - Provide Newsleaks Articles on Reuse
- Take an Active Role in Development of Public Policies
 - Work with Regulatory Agencies on Various Reuse Issues
 - Have Input into Laws and Regulations that Impact Reuse



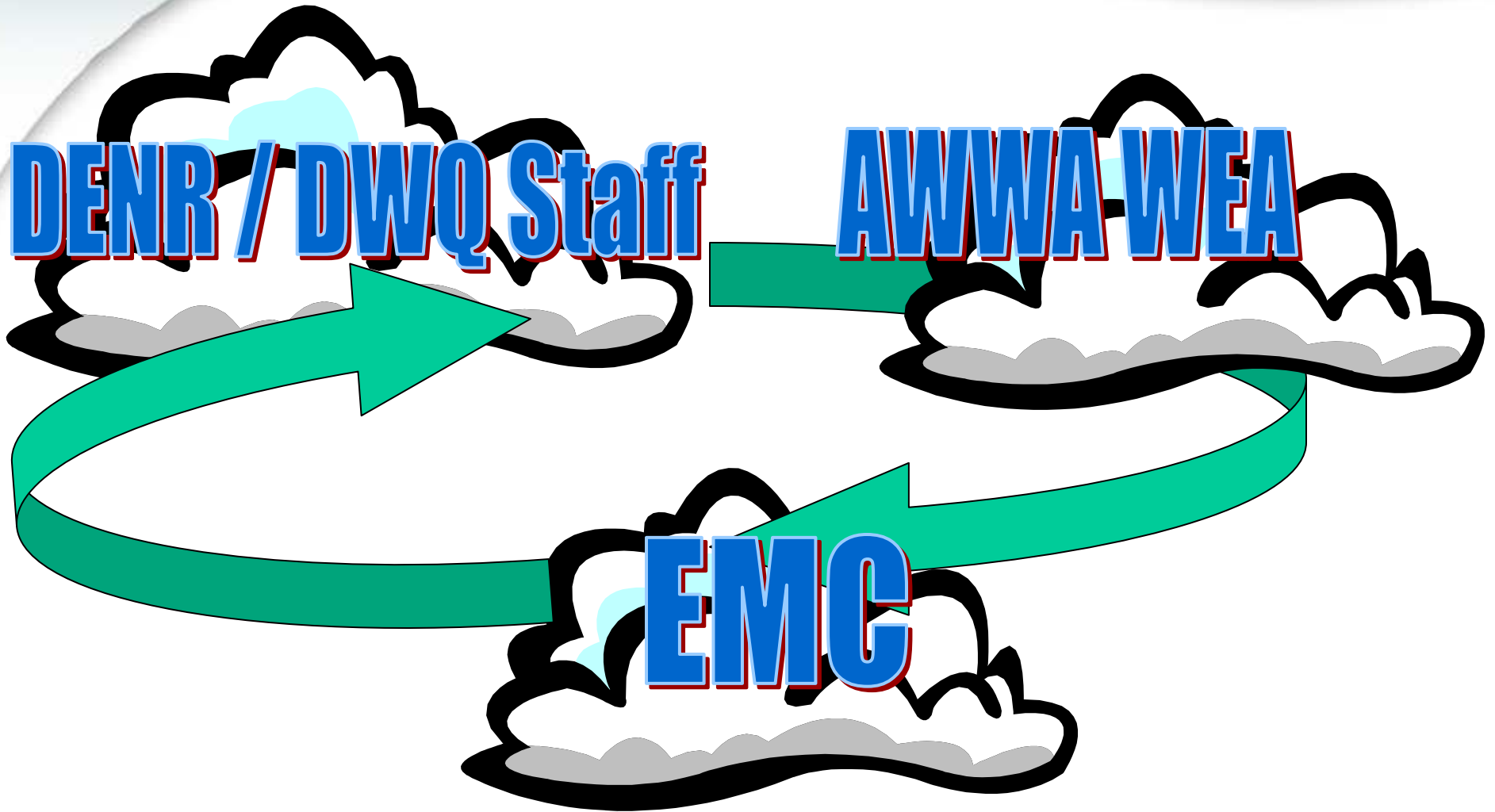
Rule Enhancement Objectives

- Elevate Reuse to Level Distinct From “Wastewater”
- Evaluate Existing Rules for Clarification Opportunities
- Evaluate Other States’ Rules and Policies for Programmatic Improvements

Traditional Rule Making Process



Proposed Rule Making Process



Administrative Components

- 15A NCAC 02H .0X01
- 15A NCAC 02H .0X02
- 15A NCAC 02H .0X03
- 15A NCAC 02H .0X04
- 15A NCAC 02H .0X05
- 15A NCAC 02H .0X06
- 15A NCAC 02H .0X07
- 15A NCAC 02H .0X08
- 15A NCAC 02H .0X09
- 15A NCAC 02H .0X10
- 15A NCAC 02H .0X11
- 15A NCAC 02H .0X12
- 15A NCAC 02H .0X13

PURPOSE

SCOPE

DEFINITION OF TERMS

ACTIVITIES WHICH REQUIRE A PERMIT

APPLICATION: FEES: SUPPORTING
INFORMATION: REQUIREMENTS

SUBMISSION OF PERMIT APPLICATIONS

STAFF REVIEW AND PERMIT PREPARATION

FINAL ACTION ON PERMIT APPLICATIONS
TO THE DIVISION

PERMIT RENEWALS

MODIFICATION AND REVOCATION OF
PERMITS

DELEGATION OF AUTHORITY

PERMITTING BY REGULATION

CONDITIONS FOR ISSUING GENERAL PERMITS

Technical Components



- 15A NCAC 02H .0X14 RECLAIMED WATER TREATMENT **PERFORMANCE** LEVELS
- 15A NCAC 02H .0X15 RECLAIMED WATER **TREATMENT** FACILITY REQUIREMENTS
- 15A NCAC 02H .0X16 RECLAIMED WATER **DISTRIBUTION** SYSTEMS
- 15A NCAC 02H .0X17 LOCAL **MUNICIPAL PROGRAMS** FOR RECLAIMED WATER SYSTEMS
- 15A NCAC 02H .0X18 RECLAIMED WATER **STORAGE** SYSTEMS
- 15A NCAC 02H .0X19 USE OF RECLAIMED WATER FOR **LAND APPLICATION** SYSTEMS
- 15A NCAC 02H .0X20 USE OF RECLAIMED WATER FOR **INDUSTRIAL OR COMMERCIAL PURPOSES**

Technical Components

- RECLAIMED WATER TREATMENT **PERFORMANCE** LEVELS

Parameter	Requirement	Class I Performance Level	Class II Performance Level
BOD₅	Monthly Average Daily Maximum	10 15	10 15
TSS	Monthly Average Daily Maximum	5 10	5 5
NH₃	Monthly Average Daily Maximum	4 6	4 6
Turbidity	Any Single Reading Daily Average 5% Daily Maximum	10 NTU N/A N/A	5 NTU 2 NTU 5 NTU
Fecal Coliform	Monthly Geometric Mean Daily Maximum	14 Colonies / 100 ml 25 Colonies / 100 ml	0 Colonies / 100 ml N / A
Total Coliform	7 Day Median 30 Day Maximum	N/A N/A	2.2 Colonies / 100 ml 23 Colonies / 100 ml

Technical Components



- RECLAIMED WATER TREATMENT FACILITY REQUIREMENTS
- Dual-Path Treatment Facilities
- Certified Operator on call 24 hours / day
- Facilities < 1.0 MGD – Equalization
- Facilities < 1.0 MGD – 5 Day Side Stream Detention Basin
- Satellite Facilities – Reduced Reliability Requirements

Technical Components

The background of the slide features a collage of three images. On the left, there is a close-up of water ripples. In the center, a large, modern water treatment facility with multiple rectangular basins is visible. On the right, there is a lush green landscape with a river or stream flowing through it.

- RECLAIMED WATER DISTRIBUTION SYSTEMS
- Labeling Requirements
- Cross-Connection Controls
- Minimum Separations
- Booster Pump Station Requirements
- Bulk Delivery via Tanker Trucks

Technical Components



- LOCAL **MUNICIPAL PROGRAMS** FOR RECLAIMED WATER SYSTEMS
- Delegation of Local Reclaimed Water Distribution System Extensions and Utilization Programs
- Similar Approach to Delegated Sewer Collection System Program

Technical Components

- RECLAIMED WATER STORAGE SYSTEMS
- Elevated or Ground Storage Tanks
 - Designed and Constructed in Accordance with AWWA Standards
- Earthen Impoundments
 - Bottoms Less than 3 Foot Above Bedrock or 1 Foot Above Seasonal High Water Table Will Need to Be Lined (1×10^{-7} cm/s)
 - Impoundment Must Preclude Surface Water or Storm Water Runoff Into Impoundment
 - Minimum of 2 Foot of Freeboard

Technical Components



- USE OF RECLAIMED WATER FOR LAND APPLICATION SYSTEMS
- Application Rates in Accordance with Agronomic Rates
 - Soil Absorption and Needs of Receiving Crop
- Public Notification of Reclaimed Water Use
- Setbacks / Buffers Associated with Class I Reclaimed Water
- Setbacks / Buffers Eliminated with Class II Reclaimed Water

Technical Components

The background of the slide features a collage of three images. On the left, there is a close-up of water with concentric ripples. In the center, a perspective view of a water treatment facility with multiple parallel channels is shown. On the right, there is a lush green landscape with a body of water and trees.

- USE OF RECLAIMED WATER FOR INDUSTRIAL OR COMMERCIAL PURPOSES
- Acknowledgement that Municipally Derived Reclaimed Water May be Used for Industrial Purposes
- Employee Notification to Inform Employees and General Public that Reclaimed Water is Being Utilized and Not Intended for Drinking.

Technical Components



- 15A NCAC 02H .0X21 INDUSTRIAL SOURCE RECLAIMED WATER SYSTEMS
- 15A NCAC 02H .0X22 USE OF RECLAIMED WATER FOR TOILET FLUSHING OR OTHER INDOOR USES
- 15A NCAC 02H .0X23 USE OF RECLAIMED WATER FOR WETLAND ENHANCEMENT OR RESTORATION
- 15A NCAC 02H .0X24 USE OF RECLAIMED WATER FOR STREAM AUGMENTATION
- 15A NCAC 02H .0X25 USE OF RECLAIMED WATER FOR GROUNDWATER RECHARGE
- 15A NCAC 02H .0X26 AQUIFER STORAGE AND RECOVERY OF RECLAIMED WATER
- 15A NCAC 02H .0X27 USE OF RECLAIMED WATER FOR INDIRECT OR DIRECT HUMAN CONSUMPTION PURPOSES

Technical Components

The background of the slide features a collage of three images. On the left, there is a close-up of a water treatment component, possibly a filter or a tank. In the center, there is a view of a large industrial facility, likely a water treatment plant, with multiple rectangular basins and structures. On the right, there is a photograph of a natural landscape with green grass and a body of water.

- **INDUSTRIAL SOURCE** RECLAIMED WATER SYSTEMS
- Requirements for Reclaimed Water Derived from Industrial Wastestreams
- Quality of Reclaimed Water Must be Protective of Employee Health and Safety
- Allowed for Industrial Processes as well as Site Irrigation
- Allowed for Off-Site Distribution
- Not Allowed for
 - Irrigation of Food Chain Crops
 - Swimming Pools, Hot-tubs or Other Similar Uses
 - Direct Potable Water Supply

Technical Components

- USE OF RECLAIMED WATER FOR TOILET FLUSHING OR OTHER INDOOR USES
- Allowed for Commercial Structures Where Access to the Plumbing System is not Readily Accessible by the Occupants
 - Churches, Schools, Universities, Apartments, Condominiums, Office Buildings and Industrial Buildings
- Not Allowed for Internal Use to any Individually Owned Residential Unit
- No Interconnection to Potable Water System Except with a Minimum 8-inch Air Gap
- Testing Requirements for Cross-Connections a Minimum of Once Every 4 Years

Technical Components

The background of the slide features a collage of three images. On the left, there's a close-up of water ripples. In the center, a perspective view of a water treatment facility with multiple parallel channels. On the right, a lush green wetland area with tall grasses and a body of water.

- USE OF RECLAIMED WATER FOR **WETLAND ENHANCEMENT OR RESTORATION**
- Hydraulic Loading Limitation to Natural Wetlands of 8 inches/week
- Hydraulic Loading Limitation to Constructed Wetlands of 14 inches/week
- Class I Performance Levels Plus TKN Limit of 3 mg/l and TP Limit of 1 mg/l
- Protective of Both Surface Water Standards and Groundwater Standards
- Long-term monitoring to demonstrate existing beneficial uses are protected or enhanced – first, second, fourth, sixth, eighth and tenth growing season.

Technical Components

The background of the slide features a collage of images related to water management and nature. At the top, there's a horizontal strip with three distinct images: a close-up of water ripples on the left, a perspective view of a large dam or bridge structure in the center, and a lush green wetland or riverbank on the right. Below this strip, a large, light-colored, curved shape resembling a stylized wave or a drop dominates the lower half of the slide, framing the text area.

- USE OF RECLAIMED WATER FOR **STREAM AUGMENTATION**
- Must Demonstrate Beneficial Purpose, such as
 - In-stream flow enhancement
 - Maintenance or enhancement of wetland uses
 - Irrigation supplies
 - Fisheries propagation
 - Groundwater recharge
 - Interbasin transfer

Technical Components



- USE OF RECLAIMED WATER FOR **GROUNDWATER RECHARGE**
- Direct injection restricted unless modeling demonstrates to the Division that groundwater standards will not be contravened
- Any subsurface injection will be retained underground for a minimum of 12 months and be separated at least 2,000 feet from an extraction point utilized for drinking water purposes.

Technical Components



- **AQUIFER STORAGE AND RECOVERY OF RECLAIMED WATER**
- Aquifer Storage and Recovery is not “Reuse”
- Comply with Division’s Underground Injection Program
- Reclaimed water should not degrade in quality – coliform levels must be met prior to reintroduction to the reclaimed distribution system
- Engineering Report must be submitted with application
 - Characteristics of reclaimed water during injection, storage and extraction phases
 - Evaluate need for additional treatment upon extraction
 - Groundwater characterization at point of injection

Technical Components



- USE OF RECLAIMED WATER FOR **INDIRECT OR DIRECT HUMAN CONSUMPTION** PURPOSES
- Must use Class II Reclaimed Water
- Irrigation of Food Chain Crops / Food Preparation Uses
 - Must have Department of Agriculture Approval
- Use for Potable Water Supply
 - Must have DEH Public Water Supply Branch Approval
 - Percentage of Reclaimed Water cannot exceed 25%
 - Annual monitoring for Cryptosporidium and Giardia

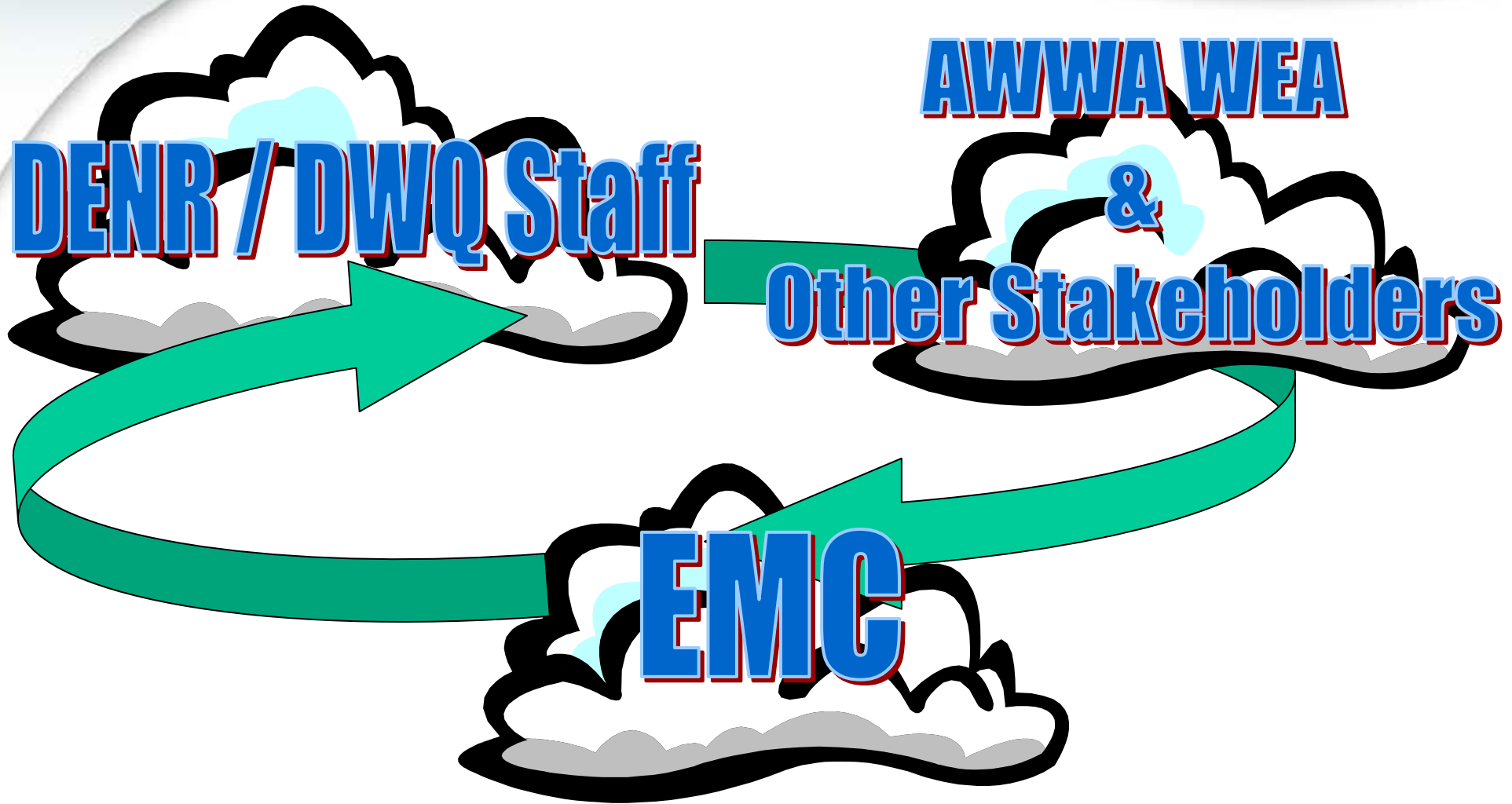
Administrative Components

• 15A NCAC 02H .0X28	ALTERNATIVE DESIGN CRITERIA AND OTHER USES
• 15A NCAC 02H .0X29	CERTIFICATION OF COMPLETION
• 15A NCAC 02H .0X30	OPERATIONAL AGREEMENTS
• 15A NCAC 02H .0X31	THE WASTEWATER TREATMENT WORKS EMERGENCY FUND
• 15A NCAC 02H .0X32	DEMONSTRATION OF FUTURE WASTEWATER TREATMENT CAPACITIES
• 15A NCAC 02H .0X33	TREATMENT FACILITY OPERATION AND MAINTENANCE

Proposed Rule Enhancement Schedule

- Reuse Rule Subcommittee
 - Completed Draft Rules December 8, 2004
- Draft Rules Submitted to AWWA WEA Government Affairs Committee
 - Approved and forwarded to Board January 21, 2005
- AWWA WEA Board Recommendation to DENR
 - Transmittal Letter Signed January 25, 2005
- Stakeholders Meetings with DENR & Appropriate Divisions
 - Initiated February 2007

Proposed Rule Making Process



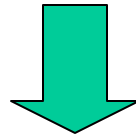
DENR Rule Making Process

- DENR Reuse Rule Review and Evaluation
 - Complete Draft Rules by December 30, 2007
- Draft Rule Submitted to EMC – Water Quality Committee
 - February 2008 EMC Meeting
- Draft Rules Submitted to EMC
 - April 2008 EMC Meeting
- Rule Public Hearing Process
 - April / May 2008
- EMC Approval of Proposed Rules
 - June 2008 Meeting
- Submission to Rules Review Commission
 - July 2008
- Rule Enhancements Adopted
 - September 2008

After Rules Are Accepted by EMC

EMC

Proposed Rules



Rules Review Commission

Maybe



General Assembly

The header of the slide features a dark blue horizontal bar at the top. Below it, a row of four images is displayed: a close-up of water ripples, a person in a small boat on a body of water, an aerial view of a large industrial facility with multiple rectangular basins, and a lush green landscape with a river. A large, white, curved shape, resembling a stylized drop or a protective shield, is positioned in the center of the slide, partially overlapping the images and the text box.

Questions?